BNL-68661-AB

Abstract for the 2001 Particle Accelerator Conference, Chicago, June 18-22, 2001

Skew-Quadrupole Focusing Lattices and Their Applications*

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Here we consider accelerator lattices with primary focusing coming directly from magnetic skew-quadrupole fields rather than normal upright quadrupole fields as are used in most particle accelerators built to date. Such skew-focusing lattices may have advantages for making compact arc focusing structures in a Neutrino Factory Muon Storage Ring and for a Very Large Hadron Collider (VLHC). Arc cell configurations using both superconducting separated-function and combined-function skew-focusing magnets are examined and examples using standard prescriptions for dispersion suppression are presented. With the substitution of skew-sextupoles for standard sextupoles, the usual chromaticity compensation schemes are found to work well. All lattices considered in this paper are fully decoupled and mainly differ from standard lattices in that their betatron eigenplanes are oriented at $\pm 45^{\circ}$ rather than the horizontal and vertical axes.

*Work supported by the U.S. Department of Energy under Contract No. DE-AC02-98CH10886.